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International Air Quality Advisory Board

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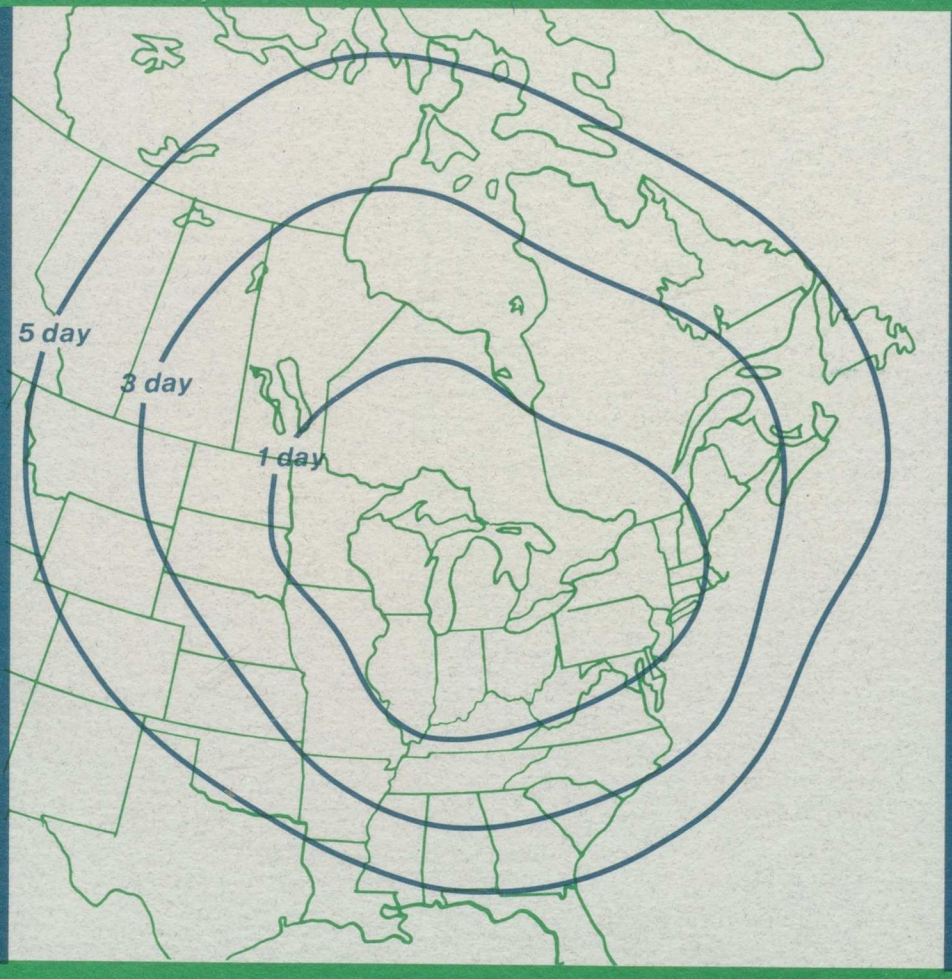
Progress Report 18 to the International Joint Commission



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September 1994

International Joint Commission
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PROGRESS REPORT 18

to the

INTERNATIONAL JOINT COMMISSION

by the

INTERNATIONAL AIR QUALITY ADVISORY BOARD

for consideration at the

ANNUAL MEETING

Ottawa, Ontario, Canada

September 22, 1994

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1. DETROIT/WINDSOR - PORT HURON/SARNIA UPDATE: HEALTH STATUS AND THE ENVIRONMENT

a. Update on IJC Recommendations

In Appendix I, the Board present a report on the status of the nineteen recommendations offered in the Commissions 1992 report Air Quality in the Detroit-Windsor-Port Huron/Sarnia Region.

In summary the Board found ongoing activities within Governments making progress on several of the recommendations. Completion of these activities would fully satisfy some of the Commission's recommendation, whereas some would only be partially satisfied. For four of the recommendations no action could be identified as ongoing within Governments. Most troubling is the inaction regarding coordination and development of a regional control strategy for ozone. This is further compounded by a request from the State of Michigan to the USEPA to reclassify the southeast Michigan "nonattainment" area to "attainment", and thereby halting any further controls of ozone causing air pollution (see section 2 of this report). Halting further controls for ozone abatement will also halt further control for certain air toxics, since some of these pollutants contribute to both problems.

Appendix I provides a complete update. In the Appendix the recommendations contained in the 1992 report is repeated and a concise update as best as the Board could ascertain it provided.

b. Status of Programs Studying Human Health

Air toxics issues related to potential health efforts have evolved to require a multi-route and multi-media strategy for monitoring, evaluation and control of the containments of concern. The direct inhalation pathway, which was the subject of the 1992 Detroit/Windsor report is only one component of the potential exposure for some of the Group I and Group II chemicals identified in that report. Recent evaluation of the risk of exposure assessments (for both non-cancer and cancer endpoints) have indicated that for certain air toxins indirect exposures derived from the deposition of the toxics on vegetation and soils are significant. And that the actual human contact can be derived from the ingestion of foods (vegetables, dairy products, and fish and meat).

Based upon the approach to screening used in the 1992 Detroit/Windsor report, toxic lead and mercury compounds were not listed as part of the chemicals of concern, but should be included in future efforts.

The Detroit/Windsor - Port Huron/Sarnia report recommended developing data and information on non-area endpoints and subtle effects (#10 and #11). Studies conducted during the 1990-1994 period have shown:

- the indirect pathway of exposure through the food chain can produce risks of up to two orders of magnitude greater than the inhalation pathway.

- the indirect pathway through the food chain affects both humans and species at the higher end of the food chain through very similar mechanisms.

- more data and studies are needed to be in a position to assess this pathway in the Michigan-Ontario region.

The Board recommends that:

- A revised assessment be done in about three years.

- Governments enhance studies and data collection now to facilitate this future assessment.

c. Status of Vegetation and Wildlife Bioindicator Programs

The environmental component of the Detroit/Windsor - Port Huron/Sarnia reference has not been effectively addressed to date. The IAQAB has taken an initial look at the literature for this region and the following tables are included as a result. While there is a potential for environmental effects and damage in this region from direct and indirect sources of toxics, there are no data available to make a satisfactory determination of the current magnitude and extent of any environmental effects.

The literature was surveyed to compile lists of species found in the Great Lakes Basin in the vicinity of the Detroit-Windsor area that are susceptible to injury due to air pollution, particularly toxic organics, ozone, and metals. Tables 1 and 2 list those sensitive species, along with the type of response to air pollution that can be expected. Table 1 is based on a figure found on page 134 of the book, "Great Lakes, Great Legacy?", published by the Conservation Foundation and the Institute for Research on Public Policy. This Table lists the vertebrate species (mammals, birds, amphibians and fish) that have shown reproductive, physiological, or behavioral responses to toxic substances, many of which are delivered to the Great Lakes ecosystem through the air pathway. These organisms are particularly affected by toxics because of their position at the top of the food web, where toxic substances are bioaccumulated.

Table 2 includes a survey of conifers and hardwood trees that show a response to air pollutants, such as ozone and sulfur dioxide. This response can be in the form of visible

injury to leaves and needles or effects on photosynthesis and growth of the individual plants. A number of understory plant species, such as milkweed and blackberry, commonly have injured leaves at the end of the growing season as a result of uptake of gaseous air pollutants. Plants can also bioaccumulate toxic metals that can affect other organisms up the food chain, such as herbivorous animals. In a number of locations near large cities and in the vicinity of power plants and smelters, lichen species diversity is reduced because of direct fumigation by gaseous pollutants (ozone, sulfur dioxide, nitrogen oxides) or accumulation of toxic metals delivered through the air pathway. Lichens are particularly susceptible to air pollution injury because they lack a protective cuticle.

The Great Lakes Basin, in general, is known for its wealth of biological diversity because of the large number of habitats available, e.g. sand dunes, coastal marshes, rocky shorelines, forests, and fens. The Nature Conservancy recently completed a report titled: "The Conservation of Biological Diversity in the Great Lakes Ecosystem: Issues and Opportunities". The July/August 1994 issue of the newsletter, "IJC Focus", includes a discussion of the findings of this report. Through the Natural Heritage Programs, we now know that the Great Lakes Basin includes a large number of species and habitats that are in danger of extinction. The report specifically identifies the savanna community along the lake plain in the Windsor area as one of the last, best examples of this ecosystem type. If the Commission requests additional work done on the issue of ecosystem health in the Detroit/Windsor area, it might be appropriate to collaborate with the Nature Conservancy to further investigate what is known about threats to such endangered habitats.

The Board recommends that the focus continue to be on the human health issue and that the implementation of appropriate controls be based on human health issues. Reductions in emissions affecting health will also benefit the natural environment. However, if the Commission wishes to explore the issue of environmental effects further, the Board recommends a well-focused pilot study of dose-response relationships for vegetation and wildlife in a natural area located in the region of interest.

Table 1. Variety of air pollution-related effects observed in vertebrates in the Great Lakes Basin.

	Reproductive effects	Eggshell thinning	Generational effects	Deformities	Organ damage	Behavioral changes	Hormonal changes	Metabolic changes "wasting"	Immune suppression	Tumors
Bald eagle	•	•	•			•				
Black-crowned night heron	•	•								
Caspian tern	•		•			•				
Chinook-coho salmon	•				•		•			•
Common tern	•				•	•			•	
Double-crested commorant	•	•	•		•	•				
Forster's tern	•		•		•	•				
Herring gull	•	•	•		•	•	•		•	
Lake trout	•		•		•	•				
Mink	•		•		•					
Osprey	•	•								
Ring-billed gull	•								•	
Snapping turtle	•	•	•		•					

Note: Effects listed have been in scientific literature published during the past decade.

Table 2. Variety of air pollution-related effects observed on vegetation in the Great Lakes Basin.

	Leaf/Needle Injury	Premature Leaf Drop	Growth Effects	Loss of Species	Bio-Accumulation
White Pine	•		•		
Black Cherry	•	•	•		
White Ash	•	•	•		
Aspen	•	•	•		
Aster	•				
Milkweed	•				
Lichen				•	•
Blackberry	•				
Yellow Poplar	•				
Sassafras	•				

2. RECONCILIATION OF U.S. AND CANADIAN OZONE STANDARDS

a. Reclassification of the Southeast Michigan Nonattainmnet Area

The differences between the U.S. and Canadian ozone standard has been and continues to be a concern of the Board. Recent events in the U.S. will work to exacerbate this concern. Earlier this year, Michigan submitted to the USEPA a request to reclassify the Detroit area, from "nonattainment" of the ozone standard to "attainment". On July 21, 1994, USEPA proposed in the *Federal Register* to take such action-- redesignating the area to "attainment" based on the submission from Michigan.

With the designation of Detroit to an attainment area for the 0.12 ppm US NAAQS, the State of Michigan would withdrawn their plans for any additional air pollution control measures for ozone. In so doing, the control plans would not be implemented and the pollution reduction benefits not derived. Because of transboundary flow of ozone and its precursors from the U.S. to Canada, and the higher U. S. standard (0.12 ppm) this action would severely impede, if not totally prevent, southern Ontario from attaining the 0.08 ppm ozone Canadian Objective. In addition, these control plans would have been effective in reduce some of the toxic air pollutants the Commission recommended be reduced in the 1992 report on air quality in the Detroit/Windsor - Port Huron/Sarnia region.

b. Bilateral Meeting

During a meeting on 25 July between Canadian Environment Minister Copps and U.S. EPA Administer Browner, Minister Copps asked the Administer to consider doing more to jointly address the ground-level ozone problems along the border. The Administrator and Minister indicated an interest in developing bilateral "pilot" efforts on ozone in the U.S.-Canada EPA Region 5 and 10 (in addition, this should be expanded to include EPA Region 1) corridors.

The Board recommends that the Commission take every opportunity to continue to discuss and promote the need to include standard reconciliation as part of the review process for re-designation of the NAAQS for ozone in the U.S.

3. VISIBILITY AND OTHER AIR QUALITY RELATED VALUES IN PROTECTED AREAS - PART 3

a. United States

As described in International Air Quality Advisory Board Reports #16 and #17, the U.S. has designated "Class 1" areas in national parks, refuges, and wilderness areas under the Clean

Air Act Amendments of 1977. As part of their Clean Air Act (CAA) mandates, the Federal Land Managers (FLM) in charge of these Class 1 areas (National Park Service (NPS), U.S. Fish and Wildlife Service (FWS), and USDA-Forest Service (USFS)), are required to implement a regulatory program known as Prevention of Significant Deterioration (PSD). NPS and FWS air managers carry out this air quality protection program for the 48 Class 1 parks and the 21 Class 1 wildlife refuges from a cooperative air quality office, located in Denver, Colorado. The USFS has organized their air quality program in a more decentralized way, with air quality specialists located in regional offices and national forest zones.

This PSD program requires that before a new major point source of air pollution can be built or have its operation changed in a way that results in a "major modification", that the operators must submit an application to the regulatory agency (the Environmental Protection Agency or the state). The FLMs are then given a chance to review the permit application and determine if the additional emissions will "adversely affect" natural resources or visibility in Class 1 areas within 100 km of the new source. The wording of the CAA charged these land managers with an affirmative responsibility to protect air quality-related values of designated Class 1 areas.

FLM review of a PSD application for a proposed project consists of three types of analyses: (1) best available control technology (BACT) analysis to minimize emissions from a new facility, (2) air quality analysis to determine if the additional emissions will cause an ambient air quality standard to be exceeded, and (3) air quality-related values analysis to estimate the effects of additional emissions on Class 1 area values. Air pollution effects on resources is considered adverse if: (1) they diminish the national significance of the area, (2) impair the quality of the visitor experience, or (3) impair the structure and functioning of ecosystems.

Recent developments in the U.S. PSD program include: (1) release by the EPA of an updated version of PLUVUE II (an EPA air pollutant transport model to be used for analysis of the effects of pollution sources on visibility) model to assess new source contributions to air quality degradation in Class 1 areas, (2) formation of the Interagency Workgroup on Air Quality Modeling to come up with better long-range transport models to be used by new source applicants, and (3) discussions by EPA, industry, and the FLMs on streamlining of the New Source Review process.

b. Canada

In Canada there are both provincial and federal parks and preserves in the boundary region that require "special protection" of resources, including air quality. Although no specific regulations exist for protection of air quality in these protected areas, the Canadian Environmental Assessment and Review Process (EARP) can be used to evaluate potential effects of air pollution from new sources on these reserves.

Canada has established a federal-provincial National Prevention of Significant Deterioration/Visibility Working Group. This group is charged with formulating a program to meet Canada's commitment under Annex 1, paragraph 4 of the Canada/U.S. Air Quality Agreement. This Annex requires that Canada develop and implement by January 1, 1995 means affording levels of preventing significant air quality deterioration and protection of visibility comparable to those developed in the U.S. This Working Group looked into the protection afforded by Canadian environmental assessment procedures and are now discussing the need for changes to existing legislation in order to meet the requirements of the Annex.

c. Canada/U.S. Cooperation

In the 1970s concern was raised about the two-way movements of acidic air pollution (acid rain) across the border, especially in eastern North America. Scientists and researchers documented the transport and transformation of sulfate and nitrate compounds in rain, snow, and particles resulting from emissions from both large, point sources (power plants, industries) and vehicle sources. In 1980 the U.S. and Canada signed a Memorandum of Intent to negotiate an agreement to control acid rain precursors. However, progress to control transboundary air pollution actually occurred unilaterally in 1987 with a Canadian federal-provincial agreement to control sulfur dioxide emissions in the seven eastern provinces. In the United States sulfur and nitrogen emissions are to be controlled as a result of provisions in the 1990 Clean Air Act Amendments.

The Canada/U.S. Air Quality Agreement was finally negotiated and signed in 1991. This Accord commits the parties to reduce emissions and to establish a joint research and monitoring network. Recent results of deliberations under this Accord are described in the draft of the 1994 Progress Report. Meetings held between the parties in 1992 and 1993 involved discussions on how to implement Article V, which calls for assessment, notification, and mitigation of sources that have the potential to cause transboundary air pollution.

During 1993 and 1994, officials from U.S. and Canadian national parks and regulatory agencies (EPA and Environment Canada) met on several occasions to exchange information on monitoring and effects research, and air quality management in protected areas. Another such exchange is planned for the summer of 1995 in the area near Glacier-Waterton parks.

d. Recommendations

To encourage the protection of visibility and other air quality-related values in parks and preserves on both sides of the border, the IAQAB recommends that the International Joint Commission undertake the following:

human health and the environment are concepts that are widely accepted by many scientists.

- that studies of relative loadings to waterbodies from atmospheric deposition have demonstrated that atmospheric deposition can be a significant contributor (and occasionally the dominant contributor) of toxic chemicals to the Great Waters.

- that although sources and source categories of many pollutants have been identified, determining the particular sources responsible for deposited pollutants is very difficult because of local, regional, and global source contributions.

- that significant adverse effects on human health and wildlife have been observed due to exposure, especially through fish consumption, to persistent pollutants that bioaccumulate.

- that ecological effects are significant and can be subtle, such as immune function impairment, reproductive problems, and neurological changes that affect survival. Other ecological effects are quite obvious and can affect survival of individuals and/or populations.

- that eutrophication, caused by excess nitrogen inputs, is a major problem in U.S. coastal waters, and, in studied estuaries, the atmospheric contribution to the total nitrogen loading is significant.

- that case studies have shown atmospheric deposition to be a major contributor of mercury, PCBs, POMs, and nitrogen.

The report fails to provide concrete recommendations and actions and tends to rely on the general content of the Clean Air Act Amendments. Recommendations of reasonable actions, integrated efforts to assess problems and reduce pollution, exploration of multiagency approaches, expressing interest to the public in establishing lesser-quantity emission rates, and examining legislation will probably not result in longterm solutions to the air toxics problem. While many positive approaches to addressing significant parts of the problem are specified, only a very few are actually associated with clear deadlines for action and specific calls for legislation.

In fairness, the first Great Waters Report focused on the definition of the existing problem and it should come as no surprise that the report is short on firm endpoints for action. The few substantive steps recommended in the report include:

- A continuing push to encourage voluntary pollution prevention to avoid costly litigation.

- A joint effort with the State Departments of Agriculture and local government agencies to collect and properly dispose of existing stocks of cancelled pesticides from residents in the Great Lakes area.

- An evaluation of current legislation to determine whether current legislation is sufficient to allow the EPA to begin forcing a clean up of the most important air toxics. (This effort requires much additional action to enforce or legislate, as appropriate, clean-up measures identified by the study.).

In addition to a general strengthening of the recommendations, and setting firm deadlines for action in the Great Waters Report, there should be use and acknowledgement of the abundant IJC work that already exists. Future reports should make a point of recognizing common airsheds with Canada and Mexico, and of progress made under the Air Quality Accord and the North American Free Trade Agreement regarding environmental issues. A North American strategy should be developed to protect and repair the Great Waters.

5. REID VAPOR PRESSURE CONTROL UPDATE

The Board has recommended and the Commission has written to Governments on the matter of controlling the volatility of gasoline through a standard for Reid Vapor Pressure (RVP), a value which defines how readily gasoline will evaporate into the air. The U.S. has acted and established a comprehensive national program which limits RVP during summer months in the border region to 9 pounds per square inch. The Board believes, at this time, that this represents an appropriate standard for limiting excessive vapors of gasoline to the atmosphere. The limits in Canada however are not comparable. For example, in Ontario and Quebec, gasoline with an RVP of 10.5 pounds per square inch may be sold. This difference in standard not only contributes to ozone formation, but also is a significant source of toxic volatile organic vapors. In addition, these organic chemicals can react with contaminants in the atmosphere to create additional toxic air contaminants and contribute to other environmental and health concerns.

6. STATUS REPORT ON THE GULF OF MAINE

A meeting, attended by scientists and policy makers for the U.S. and Canada, was held 21-22 June 1994 at the Huntsman Marine Science Center in St. Andrews, New Brunswick. A series of recommendations were presented by both a metals and an organics working group. The draft recommendations are as follows:

Metals Working Group--

1. The IJC should expand its mandate to include the Gulf of Maine.

2. Mass balance studies should be continued and completed.

3. A Gulf of Maine data information system should be made available.

4. Atmospheric deposition studies in the Gulf of Maine should be coordinated with RARGOM (Regional Association for Research in the Gulf of Maine), CIRAC (Canadian Institute for Research in Atmospheric Chemistry), the Gulf of Maine Council, SETAC (Society of Toxicologists and Chemists), and any other relevant groups, via the St. Andrews Ecological Science Center where possible,

5. A regional conference on toxic substances in the Gulf of Maine should be held, possibly in St. Andrews, centering on mass balance results.

6. An overview paper on the mass balance approach should be presented at the Gulf of Maine Science Workshop, planned for late 1995.

7. The New Brunswick Department of the Environment should take the lead in furthering mass balance studies.

8. The output from the present meeting should be published as an IJC document, with the mass balance paper as an appendix.

Organics Working Group--

1. The mass balance should be revisited by 1996-97 to update and improve it.

2. The tidal and other marine fluxes should receive special attention.

3. An intensive study should be considered, possibly in 1996.

4. An action plan is needed to make this possible, which would

also cover the long term planning.

5. New and continued sampling/monitoring is needed to enable an improved mass balance to be constructed.

6. Funding for the above is a problem and needs to be addressed. Existing activities which offer opportunities for cooperative studies should be identified and taken advantage of as much as possible.

7. The support of the Gulf of Maine Council is necessary for this work, and should be sought.

8. A paper outlining what a mass balance is useful and what the issues are with respect to hazardous air pollutants in the Gulf of Maine should be prepared and submitted to the Gulf of Maine Council.

9. A problem definition paper should specify as far as possible the data gaps identified, and discuss bioavailablity and accumulation.

10. A representative to cover atmospheric issues should be appointed to the Gulf of Maine monitoring committee.

7. LAKE ERIE STATUS REPORT

Dr. Jim Young is serving as a member of the Lake Erie Steering Committee representing IAQAB interests.

The Steering Committee is exploring the possibility of creating a holistic model for Lake Erie. At a pre-workshop two distinct approaches were examined: (1) a broad approach looking at modelling all parts of the ecosystem stresses and trying to understand significant interactions, and (2) a narrower-focused application looking specifically at the zebra mussel and incorporating other stresses later in the process.

The pre-workshop seemed to favor the broad approach, but realized that there may be time and resource constraints that could carry the activity beyond the current biennial cycle.

The issues and questions that bear on the IAQAB are:

- Advising on the atmospheric part of the model (especially the source-receptor links and the atmospheric pathways).

- Will controls on atmospheric deposition (e.g. acid rain) have an effect on the biological diversity of the lake?
- Examine non-traditional forces on the system (e.g.,do long-range transported chemicals impact the current state of the lake?)
- Is mass conserved in the current models?
- Loadings of nutrients via the atmospheric pathway.
- What is the impact of atmospheric loadings on the physical, chemical and biological system?
- How big is the atmospheric part of the loading problem?
- Can a Lake Erie model help define loading limits (from atmospheric and other pathways) on specific chemicals in order to protect the aquatic system?
- Who provides leadership? Who will be the champion?
- Can an integrated model be achieved?
- How simple can the model be without losing its credibility?
- Does the atmospheric loading of some chemicals or nutrients have any bearing on the growth or spread of zebra mussels?
- What is the relationship between changes in particle sizes of air contaminants and the water quality issues?

8. ALERT: U.S. SALE OF MERCURY STOCKPILE

According to a 7 July 1994 report by David Poulson of Booth/Newhouse Newspapers, the U.S. Department of Defense (DOD) has halted the sale of mercury from its massive stockpile, following reports that the sales subvert efforts to contain the metal and instead spread it worldwide. Although the DOD Defense Logistics Agency apparently has placed a moratorium on additional sales, 2 million pounds of mercury has already been sold on the world market and more than 3 million pounds of the metal have been authorized for sale later this year. Another 1.5 million pounds in 1995 and 760,000 pounds in 1995 are also slated for sale, if Congress approves.

The United States has 9.7 million pounds mercury left over from Cold War stockpiles in five warehouses across the country. At least until recently, defense officials hoped to sell it all.

Ten thousand flasks were sold earlier this year for $758,716, but critics say revenues are dwarfed by environmental costs. A permanent sales ban will not work because other sources will fill the void. The best we can to is restrict U.S. sales to guarantee that the ultimate use is properly controlled.

U.S. Representative Vernon Ehlers, R-Grand Rapids, Michigan moved to amend the defense budget to halt the sales for a year, after Booth Newspapers reported how the sales can lead to global pollution. The sales could supply the mercury demand of developing nations or of domestic uses now under environmental attack. Ehlers was unable to amend the House's version of the budget bill, but both he and Majority Whip David Bonior, D-Mount Clemens, Michigan claim to have secured a promise from the chairman of the defense appropriations subcommittee that the issue will be taken up this fall. U.S. Representative Fred Upton, R-St. Joseph, Michigan also submitted letters of protest to the Department of Defense and EPA. "I question the wisdom of releasing vast amounts of mercury from the stockpile with no real idea where it might wind up and whom it might threaten," Upton wrote to Secretary of Defense William Perry.

In addition to the temporary halt on sales, the U.S. Environmental Protection Agency officials from the Great Lakes region are pursuing the elimination of mercury sources and have raised the sales issue with defense officials. The issue was also raised at a recent conference of 450 international mercury experts discussing Mercury as a Global Pollutant.

Currently, the United States auctions mercury to brokers who in turn can sell it through a chain of buyers for unknown ultimate uses. According to Defense Logistics Agency records, last year Beri Mercurie Limited, a company based in Bombay, India, bought almost 100,000 pounds of mercury from the U.S. stockpiles. Mercury initially purchased by U.S. brokers could end up in developing nations. More than half of U.S. mercury exports end up in the Netherlands, an international metals trading center. Many African countries import mercury from the Netherlands for use in cosmetics.

APPENDIX I

AIR QUALITY IN THE DETROIT/WINDSOR - PORT HURON/SARNIA REGION

Update on the Nineteen Recommendations Made by the International Joint Commission

Introduction

In February 1992, the International Joint Commission released a report entitled Air Quality in the Detroit-Windsor/Port Huron-Sarnia Region. This Report was in response to a request by Governments to recommence work under the Air Quality Reference for the Region. In particular, the Commission was asked to examine and report on the actual and potential hazards posed to human health and the environment from airborne emissions in the Detroit-Windsor area.

Following consideration of an advisory board report to the Commission and public comment, the Commission arrived at eight conclusions, which in summary documented that there was sufficient data to conclude that exposure to airborne toxic chemicals represents a significant public health issue which requires immediate attention, at the same time additional data and information should be developed by Governments.

The Report presented nineteen specific recommendations to Governments. These recommendations call for specific abatement and prevention measures to reduce air pollution in the Region, as well as the development of information and policies to better understand the magnitude and extent of the human health and environmental risks which airborne toxic chemicals may represent. Following is an update on the recommendations posed by the Commission in the 1992 Report. In each case, the original recommendation is stated, followed by a concise update.

Update

1) A comprehensive air toxics monitoring program should be developed and implemented in the Detroit-Windsor and Port Huron-Sarnia corridor to address the following:

a) measurement of the 15 Group I chemicals identified by the board. These are: benzene, chromium compounds, formaldehyde, 1,3-butadiene, 1,4-dichlorobenzene, nickel compounds, benzo(a)pyrene, cadmium, chloroform, carbon tetrachloride, arsenic compounds, trichloroethylene, beryllium, 1,2-dichloroethane (ethylene dichloride) and perchloroethylene (tetrachloroethylene).

Group 1 chemicals are routinely measured as a part of the Environment Canada Network as well as the Ontario Air Toxics Network. No equivalent routine monitoring exercise is underway in the United States; limited special studies have been completed by the State of Michigan since the Report.

b) measurement of other chemicals identified by the board as present in the region following an assessment of their potential to cause adverse effects on human health or the environment. Emphasis should be placed on carcinogens listed in Categories 1 and 2 by the International Association for Research on Cancer.

No efforts were identified as underway to routinely measure "other" chemicals by either country.

c) characterization of long-term trends in air toxics data.

An effort to characterize long-term trends in air toxics data is underway through the International Atmospheric Deposition Network (IADN) which currently is composed of monitoring and modelling activities centered on each of the Great Lakes. This program focuses on selected metals and semi-volatile chemicals. Absent from the characterization of long term trend in air toxics are the toxic volatile organic chemicals. Efforts are underway to establish a mercury monitoring network for the Great Lakes and Lake Champlain. If continued, this should allow for long term analysis of mercury levels in these areas. It should be noted that the focus of IADN is the broad region of the Great Lakes, rather than levels in the urban areas of Detroit-Windsor/Port Huron-Sarnia.

d) determination of quality assurance protocols to assure network compatibility and intercomparison.

Quality assurance protocols have been established for the IADN network.

e) identification of toxic hot spots where concentration of chemicals and human exposure may be higher than generally measured in the region.

This has been done in Canada through the "Windsor Study" (a study due to be released by the end of the 1994 calendar year). This study is currently undergoing review and consists of four sections: monitoring, an emission inventory, control strategies based on modelling, and assessment.

f) deposition of the chemicals of concern onto land and water, especially those that enter the food chain and bioaccumulate.

A variety of modelling efforts are known to be underway in both the U.S. and Canada. An effort to comprehensively identify and catalog studies of this nature would be useful.

g) transport of air toxics into the region.

Source apportionment studies are being conducted using IADN data. These studies should identify the sources of the pollution measured by the network. To the extent that the IADN network region is representative of the Detroit-Windsor/Port Huron-Sarnia region, transport of air pollution sources into the region is being assessed.

2) Governments update emission inventory data on toxic air contaminants to provide a basis from which to assess potential health impacts, monitoring needs and development of emission reduction strategies.

The Great Lakes Council is developing an air toxics emission inventory for the eight states which border the Great Lakes, and the U.S. EPA has completed an inventory for atrazine and industrial sources of mercury. The Ontario emissions inventory is updated routinely. There is a need to verify that these databases are consistent and compatible for mutual needs and uses.

3) Risk assessment tools be developed and refined to determine the risk to human health from exposure to toxic substances.

A recent (US) National Research Council report reported on air toxics and risk assessment. The report lays out the scientific approach required for this effort and lays a national (US) research agenda for advancing the techniques and methods for assessing health and environmental risk.

4) Governments develop and pursue other decision-making tools to avoid total reliance on risk assessment in the control of air toxics.

Risk assessment is only one of the tools currently in place and in use in Ontario. In the United States, other decision-making tools are also available through the Toxics Release Inventory (a voluntary reporting inventory of toxic industrial emissions), the 33/50 Project, and the technology-based Maximum Achievable Control Technology (MACT) program of the 1990 Clean Air Act.

5) Procedures be developed to assess the relative and cumulative importance of various pathways by which humans are exposed to toxic chemicals.

Pathways for exposure other than solely inhalation have been developed as part of the "Windsor Study" (see update for 1 e). The U.S. EPA has also

developed a combustion strategy, and risk assessment guidelines which considers exposure to environmental contaminants by means in addition to inhalation.

6) Governments initiate and implement pollution prevention programs to reduce emissions of airborne toxics in the region, with priority attention given to the 15 known carcinogens in the board's Group I listing, especially benzene, 1,3-butadiene and formaldehyde.

The US Clean Air Act encourages voluntary reductions by exempting certain industries from the MACT standards if pollution prevention technologies have been employed. USEPA has developed such national programs as Mobility Partners, WasteWise, WAVE, Building Air Quality Alliance, Green Lights, Energy Star and the 33/50 Program to accomplish pollution prevention through voluntary efforts.. In addition, USEPA has a major program emphasis to guide and encourage states into developing pollution prevention programs.

However, it should be noted that most all these programs (both US and Canada) are focused on stationary sources (e.g. industrial sources) of air pollution, whereas by far the dominant sources of benzene, 1,3-butadiene and formaldehyde are automotive in origin. Strategies for these pollutants require programs for the maintenance of the control devices currently on motor vehicles, strict standards for new vehicles, and controls for the losses of gasoline due to the re-fueling of motor vehicles.

7) Governments assess the potential health and environmental impacts of air toxics found on the board's list to identify those chemicals, in addition to the board's Group I chemicals, that require immediate abatement and preventive measures.

The United States has identified a list of 189 chemicals in the 1990 Clean Air Act Amendments National control requirements for sources of these chemicals are scheduled and in various stages of implementation. Michigan has a program for screening large <u>new</u> sources of certain air toxics as they apply for construction permits. In Canada, a pollution prevention initiative is underway for mercury, lead, dioxin, and PCBs. Also, Ontario has guidelines for 178 species identified as part of the National Pollutant Release Inventory.

8) Governments ensure that the filling of data gaps for known carcinogens which appear on the International Agency for Research on Cancer (IARC) 1 and 2 lists and the U.S. EPA cancer classifications be given high priority to enable more precise risk assessments to be undertaken.

No action was identified addressing this issue by either country.

9) A more extensive assessment of the actual and potential reproductive and teratogenic effects of the airborne chemicals styrene, chloroform, nickel compounds, xylene, benzene and formaldehyde, identified by the Board as having an inadequate margin of safety, be undertaken.

As seen by the Great Waters Report to Congress, there seems to be an evolution in thinking regarding reproductive and teratogenic effects. The research focus is currently on the assessment of developmental effects.

10) More attention be devoted to developing data bases and compiling information on non-cancer endpoints as a result of human exposure to airborne toxic chemicals.

This is occurring as the research has indicated the importance of assessing the developmental effects of certain toxic air pollutants.

11) Research be undertaken on the subtle effects of toxic chemicals to suppress immune, endocrine and nervous systems as a basis for appropriate risk decisions.

The work and concern regarding developmental effects confirms the concern expressed by the Commission and should provide valuable data and information in better understanding the health threats of environmental exposures to these contaminants.

12) Additivity concepts be incorporated routinely into risk assessment models.

Cautious movement has been made where justified. Additivity concepts have been made for dioxins, through a "toxic equivalence" method and for other classes of compounds where the science supports the development of additivity methods.

13) Incineration facilities in the region be phased out of use or required to eliminate the production and emission of dioxins, furans, PCBs and inorganic materials, especially mercury and hydrochloric acid.

The Ontario Ministry of the Environment has placed a moratorium on all incineration in Ontario. This may have the unanticipated drawback whereby Ontario will receive emissions from New York incinerators burning waste exported from Ontario. A consent decree has been made for the Detroit solid waste incinerator. It is understood that the incinerator has been forced to install additional control devices. The installation of this equipment appears to have resolved most of the (regulatory) emissions questions. No organized phase-out effort for incinerators could be identified in Michigan.

14) Uniform state and provincial requirements be established for incineration facilities in the Reference region based on the principle of zero discharge of persistent toxic substances.

The Ontario Ministry of the Environment has moved to the principle of "zero discharge", with the moratorium on incinerators in place. For Michigan, any new incinerator must comply with Department of Natural Resources permitting requirements.

15) Government monitor incinerator emissions for phosgene gas when chlorinated organic materials are being incinerated and institute effective controls to prevent the production of this gas.

Studies completed since the IJC Report was completed have not confirmed the initial concerns for phosgene gas being routinely emitted in hazardous amounts. Reliable routine monitoring equipment for phosgene gas is not available. Equipment to monitor and report operational parameters and selected pollutant parameters is proving to be most useful in ensuring proper incinerator operation and is regularly incorporated into new major permitted facilities.

16) The Governments review current air quality objectives for sulphur dioxide and particulate matter in the region and provide the Commission with updated objectives for compliance assessment.

Neither government has answered the IJC's request for updated sulfur dioxide and particulate matter objectives for compliance assessment.

This recommendation continues to be relevant as the revisions to the Michigan State Implementation Plan for Sulfur Dioxide is in need of revision and behind schedule.

17) Consideration be given to modify the particulate objective to include PM_{10}.

Neither government has answered the IJC's request to update the particulate matter objective to include PM_{10}

This recommendation continues to be relevant as the Michigan State Implementation Plan for PM_{10} is in need of revision and behind schedule.

18) The Governments, in consultation with the State of Michigan and the Province of Ontario, develop a joint regional ozone control strategy that includes emission controls for mobile and stationary sources, including coke ovens.

Despite recommendations by the IJC to Governments, a joint regional ozone control strategy is not likely in the near future.

Michigan has requested of USEPA that the Detroit area be reclassified from "nonattainment" of the ozone standard to "attainment". USEPA proposed on July 21, 1994 to approve this reclassification request, and provided the public the opportunity to comment on this proposed action until August 21. The notice as published contained some errors, therefore EPA intends to republish a corrected notice in the Federal Register and provide an additional fifteen day public comment period. If the request to reclassify the Detroit are to "attainment" is grant (which is most likely) this action should exacerbate concerns over air quality standards because the U.S. ozone standards are fifty percent higher than Canadian objectives. Further, with the reclassification of the Detroit area, controlled strategies initially developed under the Clean Air Act will <u>not</u> be implemented by the State of Michigan. These strategies would not only reduce ozone formation in the Region, but they would also substantially reduce emissions and human exposure to toxic airborne chemicals of concern to the Commission, in particular benzene, 1,3-butadiene and formaldehyde-- Group I chemicals identified by the Commission of particular concern. The control strategies which Michigan will not include in their State Implementation Plan and the attendant emissions reductions are listed in Table A.

19) The Governments, in consultation with the State of Michigan and the Province of Ontario, adopt a common ozone standard for the Reference region.

Despite recommendations by the IJC to Governments, no progress has been made toward a common ozone standard. In fact, we not aware of any ongoing serious discussions to this end.

Table A Hydrocarbon Emission Reductions From Control Measures For The Southeast Michigan Nonattainment Area	
Description of Control Measure	**Amount of Contaminants Controlled**
Upgrade Motor Vehicle Inspection and Maintenance Program, including motor fuel with an RVP of 7.8 psi	61.6 tons per summer day
Gasoline Vapor Controls for re-fueling motor vehicle (i.e. Stage II controls)	22.5 tons per summer day
Transportation Control Measures	1.9 tons per summer day
Motor vehicle scrappage Program (10,000 vehicles)	1.0 tons per summer day
Degreasing operations controls	4.4 tons per summer day
Control of gasoline storage tank losses at service stations	2.6 tons per summer day
Control of gasoline losses when refueling gasoline dispensing facilities (i.e. Stage I)	4.8 tons per summer day
TOTAL	98.8 tons per summer day

APPENDIX II

Deposition of Air Pollutants to the Great Waters

First Report to Congress

EXECUTIVE SUMMARY

Pollutants emitted into the atmosphere are transported various distances and can be deposited to aquatic ecosystems far removed from their original sources. Scientific studies show that atmospheric deposition is often an important factor in the degradation of water quality and the associated adverse health and ecological effects in studied waterbodies. In response to the mounting information indicating that air pollution contributes significantly to water pollution, Congress included section 112(m), referred to as the Great Waters program, in the Clean Air Act, as amended in 1990 (1990 Amendments). This report fulfills the Act's requirement for a Report to Congress 3 years after enactment.

The purpose of the Great Waters program is to evaluate the deposition of air pollutants to the Great Lakes, Lake Champlain, Chesapeake Bay, and coastal waters. The report to Congress is to include information on the contribution of atmospheric deposition to pollutant loadings, the environmental or public health effects of such pollution, the source or sources of such pollution, and a description of any regulatory revisions under applicable Federal laws that may be necessary to assure protection of human health and the environment.

The scientific information currently available is summarized in this report, and recommended actions are described.

Water quality conditions in the Great Lakes and many other waterbodies are greatly improved compared to a few decades ago, the result of environmental regulatory programs and public and industrial cleanup efforts addressing primarily waterborne pollution. However, despite the improvements, the Great Waters ecosystems are far from fully recovered, and it is necessary to address the more diffuse sources of pollution, including the air component, in order to attain water quality goals and to ensure protection of human health and the environment.

Pollutants of concern to the Great Waters possess certain common characteristics. They persist in the environment and, thus, can travel great distances, often being deposited and reemitted many times. These pollutants accumulate in the environment, making the potential for exposure to them greater than for pollutants that readily degrade. The potential for long-distance transport is evident by the presence of pollutants in remote, pristine environments such as the Arctic.

Pollutants of concern also accumulate in body tissues and magnify up the food web, with each level accumulating the toxics from its diet and passing the burden along to the animal in the next level of the food web. Top consumers in the food web, usually consumers of large fish, may accumulate chemical concentrations many millions of times greater than the concentrations present in the water. As a result of unsafe concentrations of chemicals in fish, due to biomagnification, fish consumption advisories have been issued in hundreds of waterbodies nationwide, including the Great Lakes. High-risk groups, which fish consumption advisories are established to protect, include breast-feeding mothers because breast-fed babies continue to accumulate these chemicals from their mothers after birth. For example, they can have PCB levels four times higher than their mothers after 6 to 9 months of breast-feeding. Other groups at high risk are subpopulations such as sport anglers, Native Americans, and the urban poor, who tend to have high fish consumption. EPA and other agencies are addressing this environmental justice issue by examining impacts to higher-risk populations and taking this into consideration in regulating activities.

Significant adverse effects on human health and wildlife have been observed due to exposure, especially through fish consumption, to persistent pollutants that bioaccumulate. Adverse effects range from immune system disease and reproductive problems in wildlife to subtle developmental and neurological impacts on children and fetuses.

Although most of the chemicals of concern are probable human carcinogens, many are also developmental toxicants capable of altering the formation and function of critical body systems and organs. Therefore, the developing embryo and fetus and breast-fed infants are particularly sensitive to these chemicals.

Ecological effects attributable to pollutants of concern are significant and can be subtle or delayed in onset, such as immune function impairment, reproductive problems, and neurological changes all of which can affect population survival.

Other adverse ecological effects are caused by nitrogen compounds. Nitrogen compounds from atmospheric deposition exacerbate nutrient enrichment (or eutrophication) of coastal waterbodies, which results in impacts that range from nuisance algal blooms to the depletion of oxygen with resultant fish kills.

Studies show that significant portions of loadings to the Great Waters of the pollutants of concern are coming from the atmosphere. For example, 76 to 89 percent of PCBs to Lake Superior and up to 40 percent of nitrogen loadings to the Chesapeake Bay are estimated to come from air pollution. However, insufficient data are available to generalize the atmospheric loadings to all waters. Absolute quantities of deposited pollutants are also important, especially since loadings of even small amounts of pollutants that bioaccumulate can result in significant pollutant burdens in fish.

Pollutants of concern in the Great Waters originate from sources that are local to, as well as distant from, the impacted waters. Transport distances depend on the characteristics of the

chemicals and source emissions as well as weather patterns. As such, generalizing source identification from one waterbody to another would not be accurate. More data are needed to determine sources and source categories affecting the Great Waters.

Uncertainties in current information are significant, and further research is needed to better characterize the most important information for decisionmakers. However, adequate information is available to lead EPA to the conclusion that some actions are justified and necessary at this time. Adverse effects of the chemicals of concern are evident and studies of selected waters show significant proportions of toxic pollution coming from the atmosphere. However, because the linkage between specific sources and subsequent deposition and effects has yet to be demonstrated, the kinds of actions described in this report focus on the chemicals of concern rather than on specific sources.

EPA considered the implications of action and of inaction, while recognizing that section 112(m) of the 1990 Amendments mandates that EPA should act to "prevent" adverse effects and to "assure protection of human health and the environment." EPA's recommendation is that reasonable actions are justified, based on evaluation of the scientific information currently available, and should now be taken and that research should continue. The National Oceanic and Atmospheric Administration (NOAA) concurs with this recommendation.

Most of the actions EPA will undertake focus on utilizing regulatory mechanisms in the Clean Air Act that are intended to address the most hazardous chemicals. EPA believes that the characteristics of toxicity, persistence, and tendency to bioaccumulate warrant special treatment of the Great Waters pollutants of concern and that this is consistent with congressional intent for those regulatory mechanisms and for section 112(m).

The recommendations from the report fall into three strategic themes. First, EPA will continue ongoing efforts to implement section 112 and other sections of the Clean Air Act and use the results of this report in the development of policy that will reduce emissions of Great Waters pollutants of concern. Under this theme, EPA will take actions that include: publishing emission standards affecting important chemicals of concern ahead of schedule, where possible; evaluating the adequacy of control technologies for important pollutants; publishing an advance notice of proposed rulemaking (ANPR) for establishment of lesser-quantity emission rates (LQERs) to define smaller sources to be regulated as "major sources" and evaluating which Great Waters pollutants warrant establishment of an LQER; evaluating which area sources should be regulated with maximum achievable control technology (MACT); and considering appropriate emission levels requiring regulation when sources are modified.

Second, EPA recognizes the need for an integrated multimedia approach to this problem and, therefore, will utilize authorities beyond the Clean Air Act to reduce human and environmental exposure to pollutants of concern. Under this theme, EPA will take actions that include using the Great Waters Core Project Management Group as a coordinating body to communicate with other offices/agencies. The objectives will be to: coordinate work and

especially to identify lead offices to implement recommendations; support changes to the Clean Water Act that address nonwaterborne sources of water pollution; address the exportation of banned pesticides; emphasize pollution prevention efforts to reduce environmental loadings of pollutants of concern; and facilitate information sharing between EPA and other agencies.

Third, EPA will continue to support research activities and will develop and implement a program strategy to define further necessary research. Under this theme, EPA will take actions that include: focusing research planning on a mass-balance approach to determine relative loadings; using an appropriate mix of monitoring, modeling, and emission inventory tasks in conducting mass-balance work; assessing the need for tools to be developed for risk assessment for total exposure to pollutants of concern and for regulatory benefits assessment; and continuing to support ongoing research efforts.

APPENDIX III

CLIPPING SERVICE

a. General Information -- International

1. Projected Ozone Effects on Grain Crops in the Northern Mid-Latitudes

W. Chamedies et al., in SCIENCE April 1, 1994, describe the potential for reduction in crop yields in the northern mid-latitudes (including eastern North America, Europe, China, and Japan). In this region there is a strong correlation between fossil fuel burning, nitrogen oxide emissions, ozone production and agricultural production. The researchers indicated that by the year 2025 as much as 30-75% of the world's cereal crops may be exposed to ozone concentrations above the 50-70 ppbv threshold for damage.

2. Ozone Research

The North Atlantic Region Experiment (NARE), initiated last year, is a bilateral effort linking the Ozone Transport Region measuring efforts with those of the Southern Atlantic Region to characterize ozone episodes, identify ozone precursors, and track their movement into the North Atlantic region. Photochemical Assessment Monitoring Stations (PAMS), located through out the Ozone Transport Region, are measuring ozone precursors. A smaller, but nearly equivalent network, has been set up in the Maritime Provinces. The North American Research Strategy for Tropospheric Ozone (NARSTO) had its second meeting in June of 94. The goal of this effort is to link science and policy for tropospheric ozone control/prevention in eastern North America.

3. Ozone Transport Studies

Discussions between British Columbia, Washington state, and EPA Region X continue on the extent of transboundary ozone transport. The state of Washington is planning further monitoring studies in the area.

4. Meeting on Proposed International Park for the Northern Cascades Ecosystem

In March several U.S. and Canadian organizations sponsored a meeting in Seattle, Washington to discuss the creation of a North Cascades International Park. Such a park would include about 10 million acres of U.S. National Park and Forest Service areas and British Columbia parks and preserves. Both conservationists and land rights activists attended the meeting, with the latter arguing against park formation that they see as a "land grab" by Governments.

5. Meeting of the North American Commission for Environmental Cooperation (CEC)

This Commission was formed as a byproduct of the North American Free Trade Agreement and held its formulation meeting in Vancouver, B.C. in March. This Commission will implement the environmental provisions of NAFTA. At this formulation meeting there was agreement by the three signatory countries that the Commission would select an executive director and appoint five members each to the Joint Public Advisory Committee. The first regular session of the Commission occurred on July 26 in Washington, D.C.,with representation by Carol Browner (U.S. Environmental Protection Agency), Sheila Copps (Canada Department of the Environment) and Victor Loichtinger (Mexico). Mr. Loichtinger (Mexico) was appointed Executive Director of the CEC and presided over the meeting.

6. PCB Concentrations in the Atmosphere at a "Background" Site shown to be Relatively Constant

Dr. Ron Hites and Sandra Panshin (Indiana University) presented data on air concentrations of PCBs in the area around Bermuda that indicates little change in concentration during the last 20 years. There were seasonal variations in PCBs at this site, with highest concentrations recorded in the summer.

7. Mercury Advisories

Maine has issued a "no lake fish consumption" health advisory for children, pregnant women, and breast feeding mothers based on mercury levels measured in Maine fresh water fish. Similar concentrations of mercury are being found in fresh water fish from U.S. EPA Region 11 and in the Maritime Provinces and Quebec. There is yet no comprehensive program or significant resources dedicated to researching and mitigating this bilateral problem.

8. Fine Particle Transport

Efforts to measure fine particle atmospheric transport in the NE U.S. and Maritime Provinces are ongoing (5 years). These data will be useful for new standards assessments for PM 2.5 (particles smaller than 2.5 micrometers) and to support source apportionment analysis to identify which sources contribute to the levels of pollution measured.

9. IADN Update

The International Atmospheric Deposition Network (IADN) monitoring program, operational since the end of 1991, continues at the 5 Master Stations (1 per Lake). Following the recent issuance of a final Quality Assurance Program Plan, the U.S. and Canada are preparing a joint report on the state of monitoring for atmospheric deposition of PCBs, PAHs, pesticides, and trace metals which will reassess atmospheric loads to the Great Lakes. A paper is to be presented at the 15th Annual meeting of the Society of Environmental Toxicology and

Chemistry (SETAC) in November of 1994; the full report will follow soon after.

Early indications are that overall agreement between U.S. and Canadian monitoring results is quite good. Most organochlorines (OCs) exhibit very similar concentrations measured at all 5 sites, indicating that little spatial variability exists across the Basin for these compounds. Spatial gradients are evident in PAH and metal concentrations, with levels about 3-5 times higher at Sturgeon Point on Lake Erie than at Eagle Harbor on Lake Superior. Decreasing trends have been evident for levels of α-HCH and lead at the Eagle Harbor site. As/Se ratios suggest Canadian smelters are the major source category for As, while urban areas in the U.S. appear to be the major sources for lead measured at IADN sites. Seasonal variations appear to show greater summer concentrations than winter concentrations for many of the target compounds.

Net flux calculations suggest that volatilization from lake surfaces exceeds deposition for total PCBs, most pesticides, and lower molecular weight/boiling point PAH compounds (i.e., the Lakes are "sources"). Wet and dry deposition rates are about equal, but uncertainty in dry deposition estimates may be as high as an order of magnitude (depending on particle size and other assumptions). Research currently underway should help to considerably reduce uncertainty associated with dry deposition.

The one-year 10-Site Network Study (5 sites in addition to the 5 Master Stations under IADN), has been delayed until spring of 1995. This effort will focus on mercury monitoring in the vapor, particulate, and precipitation phases.

10. UV-B Monitoring

UV-B monitors, using broad spectrum measurement devices, have been deployed in NE U.S. and SE Canada. Consistency and comparability issues still must be addressed between the two countries. The monitoring program is expected to expand in both countries. In addition, the U.S. National Weather Service has begun a program of issuing a UV Index daily for seventy eight cities throughout the United States. This Index is advisory in nature for the general public and is patterned after a similar program in Canada.

11. Development of a Lakewide Management Plan for Lake Ontario

Under the agreements outlined in the Toxics Management Plan signed in 1989 by Canada, the U.S. EPA, Ontario, and New York State, nine toxic chemicals have been identified (based on the extent to which water quality standards have been exceeded) for study and control action strategies. A Lakewide Management Plan for Lake Ontario is being developed. Under the Great Lakes Water Quality Initiative Guidance, published in the Federal Register in April of 1993, specific water quality criteria (both chemical and biological) have been established for the nine chemicals. Source specific (both air and water) loading limits necessary to meet the criteria for each of the nine chemicals are being modeled. The air pathway has been determined to be significant for many of the nine

chemicals (e.g., 80% of the PCB loading to Lake Superior is estimated to come from air transport; whereas, only 16-20% of PCB loading to Lake Ontario is from air).

b. General Information -- Canada

1. Establishment of an Ecological Monitoring and Assessment Network

Environment Canada is establishing an Ecological Monitoring and Assessment Network from coast to coast, to focus existing research and monitoring activities on the effects of various stresses on Canada's ecosystems. It is intended to operate the Network with direct linkages to other North American and global monitoring and research networks.

The Canadian network will be driven by a set of goals, objectives, and needs for specific outputs agreed to by all participants. This will help to set priorities and guide scientists in conducting their research and monitoring programs.

2. Repercussions from Ontario Incineration Ban

About 18 months ago, Ontario placed a moratorium on incineration. This has resulted in an increase in the amount of hazardous waste transported into the U.S. for disposal. Some is being incinerated in the Niagara Falls area. This is raising concerns in the U.S. EPA Region 11 office.

c. General Information -- United States

1. Mercury Contamination Symposium

The Northeast States for Coordinated Air Use Management (NESCAUM) and the Conservation Law Foundation (CLF) sponsored a meeting on mercury contamination in the Northeast on July 14, 1992. Nearly 100 people from state and federal regulatory agencies, universities, and various non-governmental organizations attended the meeting; many are leading experts in mercury research. The focus of the symposium was to review the scientific and technical work that has been conducted regarding mercury contamination and to begin formulating appropriate policy to deal with this problem. Some of the more important conclusions included:

1) The northeastern states need to be involved in discussing and coordinating the mercury issue with other regions of the United States and Canada.

2) A greater public awareness and education effort is needed.

3) While the whole eastern United States is a major source area for mercury emissions, there is very little baseline data. There is a need to develop monitoring programs

throughout the whole region.

4) Structured cooperation is needed for further mercury research. A number of investigators are involved in mercury research, but at present, none of it is coordinated. Given project costs and potential for redundancy in studies, cooperation is critically needed to guide future work.

5) It was recommended by some individuals that mercury research and monitoring be integrated with existing atmospheric control strategies e.g., O_3, NO_x, SO_2, Pb, Cd, dioxin. There was strong emphasis on good science and that funding should be tied to well-designed research proposals. There was also broad support for work on a regional scale, as well as local and global scales.

6) There was consensus that although there is a great need for more baseline information to better understand the extent and implications of mercury contamination, it was also time to begin to formulate a policy response to this problem.

2. Researchers Evaluate Trend in Visibility in National Parks of the U.S.

Researchers from the University of California, Davis have analyzed 10 years of fine particle data collected at 12 national parks throughout the United States. They report that some parks in the West recorded improved visibility from 1982 until 1992, while parks in the East have experienced degraded visibility during that period. The parks with the most improved visibility include: Chiricahua National Monument in Arizona and Mesa Verde National Park in Colorado; the parks with the worst visibility are Great Smoky Mountains (North Carolina/Tennessee) and Shenandoah (Virginia) National Parks. These data were collected as part of the interagency visibility monitoring network known as Interagency Monitoring for the Protection of Visual Environments (IMPROVE).

3. Clinton Administration Plans for Air Quality Research Coordination

President Clinton has called for all executive departments and agencies to coordinate science and technology policy though the newly-created National Science and Technology Council (NSTC) in order to integrate these functions throughout the U.S. Federal Government. Within the NSTC there was created the Committee on Environment and Natural Resources, Subcommittee on Air Quality Research. This subcommittee is charged with looking at five air quality issues: indoor air pollution, ozone and other pollutants, visibility and particles, airborne toxics, and acidic deposition. At a recent forum in Washington, D.C. (March 1994) non-government experts in these areas met in working group sessions to further define priorities in these research areas.

4. U.S. National Park Service Presents Plan for Clean-up of Air Quality in Eastern Parks

The NPS has introduced the CLEAR (Clearer Look at Eastern Air Resources) strategy to improve air quality in national parks in the eastern U.S., including the Class 1 areas such as Acadia (Maine), Shenandoah (Virginia), Great Smoky Mountains (NC/Tenn), Everglades (Fla), and Mammoth Cave (KY) National Parks. The NPS will work with states to expand protection of natural and cultural resources and will encourage NPS officials to adopt pollution control measures on park lands. This latter strategy would include the adoption of California auto emission standards for NPS vehicles, use of carpooling, and investigation of electric vehicles for park transportation.

5. Congressional Hearings Focus on Regional Haze in Class 1 Parks and Wilderness Areas

In April the U.S. House Subcommittee on Environment, Energy, and Natural Resources, chaired by Representative Synar (D-Oklahoma) held hearings on the issue of visibility degradation in national parks and wilderness areas. At issue was a statement made by a General Accounting Office report (1990) that "90% of polluting facilities which affected the parks and wilderness areas were exempt from the Prevention of Significant Deterioration Program because of their age or size". Under the 1977 Clean Air Act Amendments the Environmental Protection Agency was required to issue regional haze regulations to protect clean air areas; these have not yet been issued.

6. Washington State Monitoring of Canadian Smelter Emissions

The state of Washington is setting up monitoring stations to measure airborne metals and $S0_2$ from the Cominco smelter on the Columbia River in British Columbia.

7. Air Toxics Ship Sampling Completed

The EPA Great Lakes National Program Office reports that it has just completed the ship sampling phase (for organics, trace metals, and mercury) of the Lake Michigan Mass Balance Study. Weather conditions were ideal to meet the objectives of the study which are to evaluate the extent of (1) large particle drift from Chicago, (2) volatilization from the Lake (air/water exchange), and (3) uptake by biota.

8. Lake Champlain Air Toxics Research Required

Lake Champlain, one of the Great Waters, requires further attention from the toxic trace element perspective. Estimates from the Vermont Agency of Natural Resources indicate that more than 50% of these toxics are coming from Canadian smelters.

9. Great Lakes Toxics Modeling Exercises and Emissions Inventories

A number of U.S. EPA modelling efforts and emissions inventories are currently in various stages of completion for the Great Lakes.

Completed studies include:

- A simulation of lead transport and deposition (wet and dry) to eastern US and Canada from St. Louis using the Regional Lagrangian Model of Air Pollution (RELMAP) model.
- Development of a U.S. emissions inventory for the pesticide atrazine based on application data and volatilization estimates.
- Development of a U.S. emissions inventory for mercury from all significant industrial sources.
- Simulation of mercury transport, chemistry and deposition (wet and dry) from U.S. sources to all of the U.S. and southern Canada using a special version of RELMAP with 40-km grid resolution to allow estimation of impacts to individual Great Lakes.

One additional study that is currently underway examines a simulation of transport and deposition (wet and dry) to eastern US and Canada of lead, cadmium, arsenic, mercury, polycyclic aromatic hydrocarbons (PAHs) and dioxins with RELMAP, again using 40-km grid resolution.

The following studies are planned:

- A modelling effort to focus on characterizing/parameterizing key processes such as large particle contribution, gas/particle partitioning, and wet and dry deposition at the air/water interface.
- Development of a Toxic Linear Chemistry Model (TLCM) using Eulerian framework with aerosol particulate physics and high-resolution grid nesting capabilities.
- Modeling of transport, chemical and physical transformation, and wet and dry deposition of various semi-volatile toxic compounds to the Great lakes using TLCM.

10. U.S. EPA Reassessment of Dioxin and Related Compounds

The U.S. EPA recently reviewed the status of research and policy relating to dioxins and other similar compounds. Discussion topics included a historical perspective covering routes of exposure, human and animal health responses, and clean-up efforts. The review was focused on risk characterization and included the views and data of many groups both within

and outside of Government. A laundry list of toxic effects was reported based on dose-response relationships; exposure scenarios were documented. At-risk populations were identified (primarily subsistence fishermen and nursing infants, but to some extent, all of us) and policy implications were discussed.

d. Recent U.S. Legislation

1. Sulfur Oxide National Ambient Air Quality Standards (NAAQS) -- Proposed Rule

The U.S. EPA proposes to retain the existing NAAQS for sulfur oxides. Adding an alternative 1-hour primary standard of 0.4 ppm to replace the 3-hour standard (0.5 ppm) is being considered. EPA also proposes to revise the significant harm levels, the Pollutant Standards Index for SO_2, and certain monitoring and reporting requirements. Action on the final rule is due in October of 1994.

2. Review of NAAQS for Ozone

The U.S. EPA is updating the air quality criteria to take into account new health and welfare effects information. A revised criteria document and staff paper will be reviewed by the Clean Air Scientific Advisory Committee (CASAC), and EPA will determine if revisions to the criteria are necessary. The final rule is expected by June of 1997.

3. Review of NAAQS for Particulate Matter

The U.S. EPA will undertake to update and revise, where appropriate, the air quality criteria for particulate matter (PM). No timeline is available yet.

4. Review of NAAQS for Carbon Monoxide

The U.S. EPA has reviewed ongoing studies on health effects of carbon monoxide. The NAAQS will not be revised.

5. New Source Performance Standards for Nitrogen Oxide Emissions from Electric Utility Steam Generating Units

The U.S. EPA will propose to revise existing new source performance standards for NO_x emissions from fossil-fuel fired steam generating units, including electric utility units, to reflect improvements in methods for the reduction of NO_x emissions. A notice for proposed rulemaking is due by September, 1994. The final rule is due by September 1995.

6. Organic Solvent Degreasing Regulations

The EPA proposes to regulate the emissions of certain organic hazardous air pollutants from new and existing halogenated solvent cleaning machines under Section 112 of the Clean Air Act.

7. Municipal Waste Combustors

The U.S. EPA will set standards of performance and emission guidelines for new and existing municipal waste combustors. A final rule is due in September of 1995.

8. Radionuclide Major Source Definition

Section 112(a) of the Clean Air Act defines a major source as any source that emits 10 tons or more per year of any hazardous air pollutant, or 25 tons or more per year of any combination of hazardous air pollutants. The ton quantities are inappropriate for radionuclides, as very small emissions of radionuclides may be extremely hazardous. EPA will, thus, establish different criteria for radionuclides. No schedule for rulemaking is available yet.

9. Greenhouse Gas Emissions and Reductions

The Department of Energy announced the availability of draft guidelines for the voluntary reporting of greenhouse gas emissions, their reduction, and carbon fixation achieved through any measure. The guidelines assist parties in analyzing activities and determining emissions and reductions in order to report this data. Final guidelines should be available in November of 1994.

10. Petition to Lower Annual Dose Limits for the General Public

The Nuclear Regulatory Commission announced the receipt of a petition requesting that NRC amend its regulations to lower the annual dose limit of ionizing radiation received by the general public from 100 mrem/yr to 1 mrem/yr.

11. Lead Hazard Standards

The U.S. EPA will identify the paint conditions and lead levels in dust and soil that would result in adverse human health effects. The final ruling is due in September of 1995.

12. Ash from Municipal Solid Waste Combustion

A recent Supreme Court decision held that ash generated by municipal waste-to-energy facilities that burn household wastes is not exempt from regulation as hazardous waste. The U.S. EPA announced that it considers this ash to be newly identified waste which must be

tested by the generator to determine whether it is hazardous. This rule became effective in June of 1994.

13. Reduced Lead Concentrations in Blood

According to the Third National Health and Nutrition Examination Survey (NHANES III), lead-blood levels have dropped by more than 75 percent during the last 15 years, although 1.7 million children still have high lead levels in their blood. The survey involved taking blood samples from 12,000 people between 1988 and 1991 and comparing it to a previous survey. 8.9 percent of children between 1 and 5 years old were found to have high blood-lead concentrations in 1991 compared to more than 88 percent of children in the same age group in the late 1970s. The drop is credited to the banning of lead-based solder in cans and food tins, and banning lead additives in gasoline. Banning lead-based paint and leaded drinking water pipes, solder and flux also contributed to the drop.